

WHAT IS CLAIMED IS:

- Sub 1*
1. A reactor ~~comprising~~ a heating filament array having a movable electrode and a force regulator attached to the movable electrode.
  2. The reactor of claim 1 wherein the reactor is a chemical vapor-deposition reactor.
  3. The reactor of claim 1 wherein the reactor is a carbon-deposition reactor.
  4. The reactor of claim 1 wherein the heating filament comprises tungsten.
  5. The reactor of claim 1 wherein the force regulator is an adjustable force regulator.
  6. The reactor of claim 5 wherein the adjustable force regulator comprises a spring attached to an adjusting screw.
  7. The reactor of claim 5 wherein the adjustable force regulator comprises an actuated cylinder.
  8. The reactor of claim 1 wherein the movable electrode sits on a roller on which the electrode may roll.
  9. The reactor of claim 8 wherein the roller is a rod.
  10. The reactor of claim 1 wherein the movable electrode is attached to a flexure.
  - Sub 2* 11. The reactor of claim 1 wherein the movable electrode is attached to the force regulator through a cantilever.
  12. The reactor of claim 11 wherein the cantilever has a pivoting slide on which the movable electrode is mounted.

13. The reactor of claim 1 wherein the heating filament array comprises all filaments in the reactor.
14. A method for preventing breakage of a heating filament, said method comprising:
  - a. forming a heating filament array having at least two heating filaments and a movable electrode;
  - b. attaching a force regulator to the movable electrode; and
  - c. applying a force on the heating filaments of the array with the force regulator.
15. The method of claim 14 wherein the step of applying a force is performed prior to operation of the filaments.
16. The method of claim 14 wherein the filament carburizes during use.
17. The method of claim 14 wherein the force regulator is an adjustable force regulator.
18. The method of claim 17 wherein the force is adjusted before operation of the filaments.
19. The method of claim 17 wherein the force is adjusted periodically during operation of the filaments.
20. The method of claim 17 wherein the force is adjusted continuously during operation of the filaments.
21. The method of claim 17 wherein the force is adjusted manually.
22. The method of claim 17 wherein the force is adjusted automatically.

23. The method of claim 17 wherein the force on the filament is controlled using a measurement of strain on the filament.
24. The method of claim 17 wherein the force is adjusted during chemical-vapor deposition on a substrate.
25. The method of claim 17 wherein the force is adjusted during carbon deposition on a substrate.

*Sub 26.* A reactor comprising a heating filament array having a movable electrode and a means for applying a force on the filaments of the array, wherein the means for applying a force on the filaments of the array is attached to the movable electrode.

*15 27.* The reactor of claim <sup>14</sup>26 wherein the means for applying a force on the filament is an adjustable tensioning means.

*16 28.* The reactor of claim <sup>15</sup>27 wherein the adjustable tensioning means comprises a spring attached to an adjusting screw.

*17 29.* The reactor of claim <sup>14</sup>26 wherein the array is comprised of all filaments in the reactor.

*18 30.* The reactor of claim <sup>14</sup>26 wherein the movable electrode sits on a rolling support means that supports the movable electrode and allows the electrode to move.

*19 31.* The reactor of claim <sup>14</sup>26 wherein the movable electrode is attached to a joint that flexes to allow the electrode to move.

*20 32.* The reactor of claim <sup>14</sup>26 wherein the means for applying a force on the filament and the array are attached on opposite sides of a pivoting and sliding assembly on which the electrode rides.

- 21 33. <sup>14</sup> The reactor of claim 26 wherein the means for applying a force applies a force that is substantially parallel to the axis of the filament.
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34. An improved method of making diamond-coated tools in a chemical-vapor deposition reactor comprising:
- a. forming a heating filament array having a movable electrode;
  - b. attaching a force regulator to the movable electrode;
  - c. applying a force to the filaments of the array with the force regulator; and
  - d. depositing carbon on a substrate at conditions sufficient to grow diamond thereon.
35. The method of claim 34 wherein the array comprises all filaments in the reactor.
36. The method of claim 34 wherein the heating filaments of the array carburize during deposition of carbon onto the substrate.
37. The method of claim 34 wherein the force regulator is an adjustable force regulator.
38. The method of claim 37 wherein the adjustable force regulator comprises a spring attached to an adjusting screw.
39. The method of claim 37 wherein the movable electrode sits on a roller on which the electrode may roll.
40. The method of claim 39 wherein the roller is a rod.

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41. The method of claim 37 wherein the movable electrode is attached to a flexure.
42. The method of claim 37 wherein the movable electrode is attached to a cantilever.
43. The method of claim 37 wherein the force is adjusted before operation of the filaments.
44. The method of claim 37 wherein the force is adjusted periodically during operation of the filaments.
45. The method of claim 37 wherein the force is adjusted continuously during operation of the filaments.
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